WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a first semiconductor layer formed on a semiconductor substrate;

an outgoing base electrode formed on the first semiconductor layer;

a base layer formed on the first semiconductor layer, connected to the outgoing base electrode at a side surface of the outgoing base electrode, and formed of silicon germanium containing carbon; and

a second semiconductor layer formed on the base layer.

2. A semiconductor device comprising:

a first semiconductor layer formed on a semiconductor substrate;

an outgoing base electrode formed on the first semiconductor layer;

a base layer formed on the first semiconductor layer, connected to the outgoing base electrode, and formed of silicon germanium containing carbon; and

a second semiconductor layer formed on the base layer,

the outgoing base electrode and the base layer are formed continuous to each other.

3. A semiconductor device according to claim 1, wherein

the base layer contains carbon by 0.01% to 6%.

4. A semiconductor device according to claim 2, wherein

the base layer contains carbon by 0.01% to 6%.

5. A semiconductor device according to claim 1, wherein

a dopant concentration of the base layer at the part connected to the outgoing base electrode is higher than a dopant concentration of the base layer immediately below the second semiconductor layer.

6. A semiconductor device according to claim 2, wherein

a dopant concentration of the base layer at the part connected to the outgoing base electrode is higher than a dopant concentration of the base layer immediately below the second semiconductor layer.

7. A semiconductor device according to claim 1, wherein

side-etching of an insulation film immediately below the outgoing base electrode is below 0.1 μm.

8. A semiconductor device according to claim 2, wherein

side-etching of an insulation film immediately below the outgoing base electrode is below 0.1 μm.

9. A semiconductor deice according to claim 1, wherein

the base layer is projected upward beyond the upper

surface of the outgoing base electrode by above 0.02 μm.

10. A semiconductor deice according to claim 2, wherein

the base layer is projected upward beyond the upper surface of the outgoing base electrode by above 0.02 μm.

11. A semiconductor device according to claim 1, wherein

the first semiconductor layer is a collector layer; and

the second semiconductor layer is an emitter layer.

12. A semiconductor device according to claim 2, wherein

the first semiconductor layer is a collector layer; and

the second semiconductor layer is an emitter layer.

13. A method for fabricating a semiconductor device comprising the steps of:

forming an outgoing base electrode with an opening formed in on a first semiconductor layer formed on a semiconductor substrate; and

forming a base layer of silicon germanium containing carbon at least in the opening; and

forming a second semiconductor layer on the base layer.

14. A method for fabricating a semiconductor device according to claim 13, wherein

the step of forming the base layer includes the step of forming a carbon-content silicon germanium layer in the opening and on the outgoing base electrode; the step of burying a mask material in the opening with the carbon-content silicon germanium layer; and the step of etching the carbon-content silicon germanium layer with the mask material as a mask.

15. A method for fabricating a semiconductor device, comprising the steps of:

forming a base layer of silicon germanium containing carbon and an outgoing base electrode connected to the base layer on a first semiconductor layer formed on a semiconductor substrate, the base layer and the outgoing base electrode being formed continuous to each other; and

forming a second semiconductor layer on the base layer.

16. A method for fabricating a semiconductor device according to claim 13, further comprising:

the step of implanting a dopant in the interface between the base layer and the outgoing base electrode.

17. A method for fabricating a semiconductor device according to claim 14, further comprising:

the step of implanting a dopant in the interface between the base layer and the outgoing base electrode.

18. A method for fabricating a semiconductor device according to claim 15, further comprising:

the step of implanting a dopant in the interface between the base layer and the outgoing base electrode.

19. A method for fabricating a semiconductor device according to claim 16, wherein

in the step of implanting a dopant, the dopant is implanted obliquely to the surface of the semiconductor substrate.

20. A method for fabricating a semiconductor device according to claim 17, wherein

in the step of implanting a dopant, the dopant is implanted obliquely to the surface of the semiconductor substrate.